Exploration of a Precision Docking and Collaborative Tackling Model for Technological Demands of Xiangyang Enterprises Based on the Hub Role of Learned Societies

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Abstract: Against the dual backdrop of industrial transformation and upgrading and innovation-driven development, the precise matching and collaborative tackling of enterprise technological demands have become crucial paths to overcome industrial development bottlenecks and enhance the core competitiveness of the Xiangyang region. Learned societies, serving as core hubs connecting the government, enterprises, universities, and research institutes, play an irreplaceable role in promoting industry-university-research collaboration and solving enterprises´ "chokepoint" technological challenges by leveraging their unique advantages in talent aggregation, technology integration, and resource consolidation. Guided by the development needs of Xiangyang´s "3+4" modern industrial system and considering the functional characteristics of hub-type learned society organizations, this paper systematically analyzes the current status, problems, and root causes of technological demand docking and collaborative tackling among Xiangyang enterprises. It explores the construction of a full-chain model centered on learned societies as the core hub, encompassing precise demand excavation, efficient resource linkage, collaborative tackling implementation, achievement transformation and application, and support from a guarantee system. This provides theoretical reference and practical pathways for enhancing the technological innovation capabilities of Xiangyang enterprises and promoting high-quality industrial development.

Keywords: Learned Societies; Hub Role; Xiangyang Enterprises; Technological Demands; Precision Docking; Collaborative Tackling

0. Introduction

Currently, China´s economy has transitioned from a phase of rapid growth to a stage of high-quality development, with technological innovation becoming the core driving force leading industrial upgrading and cultivating core competitiveness. As a provincial sub-central city and a central city in the Han River basin of Hubei Province, Xiangyang is making all-out efforts to build a "3+4" modern industrial system, focusing on "three leading industries" (new energy and intelligent connected vehicles, modern phosphorus and coal chemical engineering, and agricultural product processing) and cultivating "four pillar industries" (new energy and new materials, high-end equipment manufacturing, biomanufacturing, and low-altitude economy), thereby promoting the transformation and upgrading of traditional industries and the accelerated rise of emerging industries. However, in the process of industrial development, Xiangyang enterprises commonly face problems such as unclear expression of technological demands, limited access to innovation resources, loose industry-university-research collaboration, and insufficient capacity for tackling core technologies. These issues have become "blockages" and "difficulties" constraining the high-quality development of enterprises.

As mass organizations for scientific and technological workers, learned societies serve as bridges and links connecting the government, enterprises, universities, and research institutes,

characterized by distinct hub functions, professionalism, and service orientation. Hub-type learned societies can establish communication platforms among multiple actors, integrate cross-boundary innovation resources, precisely match technological supply and demand, promote collaborative tackling, and resolve "breakpoints" in the innovation chain. Compared with the macro-regulation of government departments and the profit-driven nature of market entities, learned societies can base their work on the actual needs of enterprises, leverage their flexible service advantages, and provide precise services in areas such as technological demand excavation, resource linkage, and achievement transformation. Based on this, an in-depth exploration of a precision docking and collaborative tackling model for technological demands of Xiangyang enterprises, based on the hub role of learned societies, to integrate regional innovation resources, enhance enterprises´ technological innovation capabilities, and promote deep integration of industry, academia, and research, holds significant theoretical and practical value for accelerating the construction of a regional scientific and technological innovation center and achieving high-quality industrial development in Xiangyang.

1. Current Status and Problems of Technological Demand Docking and Collaborative Tackling for Xiangyang Enterprises Based on the Hub Role of Learned Societies

1.1 Development Status

In recent years, Xiangyang City has placed high importance on scientific and technological innovation and industry-university-research collaborative development. Various learned societies (associations) have actively played their hub roles and carried out a series of work regarding enterprise technological demand docking and collaborative tackling, achieving certain results. Currently, Xiangyang has formed a learned society system covering multiple fields such as automotive, machinery, chemical engineering, agriculture, and electronic information. Relying on their professional advantages, various societies have gathered a number of industry experts and talents, providing human resource support for enterprise technological services. Meanwhile, drawing on the experience of hub-type learned society construction from other regions, some societies have begun to focus on cross-boundary resource integration, gradually playing a hub role in linking the government, enterprises, universities, and research institutes. Through activities such as enterprise research, technical consultation, and academic exchanges, various societies have initially established channels for collecting enterprise technological demands and promoted technical cooperation between universities/research institutes and enterprises. Some societies have taken the lead in organizing joint tackling efforts involving enterprises, universities, and research institutes, solving some technological problems for enterprises. The number of Academician Expert Workstations in Xiangyang City has reached 147, ranking first in the province. Learned societies have played a significant bridging role, facilitating the connection between research teams and enterprises and accelerating the industrialization of new technologies such as perovskite solar cells and environmentally friendly gas-insulated switches. Simultaneously, the science and technology innovation supply chain platform promoted by learned societies has precisely matched 1,895 enterprise demands, with the transaction volume of technology contracts exceeding 35 billion yuan in the first half of 2025.

1.2 Main Existing Problems

1.2.1 Insufficient Leveraging of the Hub Role of Learned Societies; Linkage Capacity Needs Improvement

Some learned societies remain at the level of traditional academic exchanges and member services, failing to fully leverage the linking, integrating, and serving functions of hub-type organizations. The connections between learned societies and enterprises, universities, and research institutes are not close enough. Their understanding of enterprise technological demands is not deep enough, and their grasp of technological achievements from universities and research

institutes is not comprehensive, making it difficult to achieve precise matching of technological supply and demand. At the same time, the cross-boundary resource integration capacity of learned societies is insufficient. They have not effectively integrated government policy resources, financial institution capital resources, and industrial association industry resources. The flow of innovation elements is not smooth, making it difficult to form collaborative innovation synergies.

1.2.2 Imprecise Excavation of Enterprise Technological Demands; Unclear Demand Expression

Currently, some enterprises in Xiangyang have an insufficiently clear understanding of their own technological demands, lacking systematic demand analysis and sorting. They often only focus on immediate production technology problems, paying insufficient attention to long-term technology upgrading and product innovation needs. Meanwhile, the expression of enterprise technological demands is not standardized or specific enough, lacking clear definitions of core content such as technical indicators, application scenarios, and expected benefits. This results in learned societies having difficulty accurately grasping enterprise demands during the docking process and being unable to effectively match suitable innovation resources.

1.2.3 Inadequate Collaborative Tackling Mechanisms; Imperfect Benefit Distribution and Risk Prevention

Currently, the collaborative tackling mechanisms in Xiangyang based on the hub of learned societies are still not sound enough, and a pattern of multi-actor collaborative effort has not yet fully formed. First, there is a lack of effective coordination mechanisms. When learned societies organize collaborative tackling involving enterprises, universities, and research institutes, it is difficult to effectively coordinate the interests and division of labor among all parties, leading to slow progress in tackling work and even situations where each party works independently. Second, the benefit distribution mechanism is unreasonable. Issues such as ownership and profit distribution of collaborative tackling achievements lack clear agreements, making it difficult to fully motivate the innovation enthusiasm of universities and research institutes and the participation enthusiasm of enterprises. Third, the risk prevention and control mechanism is imperfect. Various risks, including technical, market, and financial risks, exist during the technology tackling process. The lack of an effective risk-sharing mechanism leads to some actors being reluctant to participate in collaborative tackling due to concerns about bearing risks.

1.2.4 Unsmooth Achievement Transformation Mechanisms; Slow Technology Application and Impact

The transformation and application of collaborative tackling achievements are key to realizing the value of technological innovation. However, the achievement transformation mechanisms in Xiangyang based on the hub of learned societies are still not smooth enough. First, learned societies lack professional achievement transformation service teams, making it difficult to provide full-process services such as technology evaluation, market promotion, and industrialization docking. Consequently, some technological achievements remain at the laboratory stage and cannot be effectively transformed into enterprise production capacity. Second, there is a lack of effective incentive mechanisms for achievement transformation. Insufficient incentives for outstanding entities and individuals during the achievement transformation process make it difficult to motivate all parties to promote achievement transformation.

2. Construction of a Precision Docking and Collaborative Tackling Model for Technological Demands of Xiangyang Enterprises Based on the Hub Role of Learned Societies

2.1 Precise Demand Excavation, Standardized Demand Expression

Demand excavation is the prerequisite for precision docking. Learned societies should take the lead in establishing a "multi-channel, multi-level, comprehensive" enterprise technological demand excavation mechanism to ensure the precision and standardization of demand excavation.

Establish a regular research mechanism. Learned societies organize expert teams to conduct field research in key enterprises and small and medium-sized enterprises within Xiangyang's "3+4" modern industrial system, comprehensively understanding their technological demands in areas such as production and operation, product R&D, and technology upgrading, distinguishing between common and individual demands, as well as short-term and long-term demands.

2.2 Efficient Resource Linkage, Achieving Supply-Demand Matching

Resource linkage is the core of precision docking. Relying on an innovation resource database, learned societies should establish a resource linkage mechanism of "precision matching, efficient docking" to achieve efficient alignment between enterprise technological demands and innovation resources. First, establish a resource integration mechanism. Learned societies integrate the technological achievements and expert talents from universities and research institutes, the capital resources from financial institutions, the industrial resources from industry associations, and the policy resources from the government. They establish an innovation resource database covering technology, talent, capital, policy, market, and other aspects, achieving centralized management and sharing of resource information. Second, establish an intelligent matching mechanism. Utilize technologies such as big data and artificial intelligence to screen out highly matching universities, research institutes, technical teams, financial institutions, etc., from the innovation resource database based on the core content of the enterprise technological demand list, forming resource matching plans.

2.3 Collaborative Tackling Implementation, Solving Technological Problems

Collaborative tackling is the key to achieving technological breakthroughs. Learned societies should take the lead in establishing a collaborative tackling mechanism characterized by "clear division of labor, efficient collaboration, benefit sharing, and risk sharing," organizing multiple actors such as enterprises, universities, and research institutes to conduct joint tackling around enterprise technological demands. First, establish a tackling organization mechanism. As organizers and coordinators of collaborative tackling, learned societies should clarify the division of labor, responsibilities, and obligations of all parties, form collaborative tackling teams, and formulate detailed tackling plans, timelines, and roadmaps to ensure orderly progress of tackling work. Second, establish a tackling guarantee mechanism. Learned societies coordinate with the government and financial institutions to provide financial support for collaborative tackling projects, coordinate with universities and research institutes to provide technical support and talent guarantees for tackling projects, and coordinate with enterprises to provide practical support such as test sites and production data for tackling projects.

2.4 Achievement Transformation and Application, Realizing Value Enhancement

Achievement transformation is the core of realizing the value of technological innovation. Learned societies should take the lead in establishing a "full-process, diversified" achievement transformation mechanism to promote the transformation of collaborative tackling achievements into enterprise production capacity. Establish an achievement promotion mechanism. Learned societies utilize their resource advantages to conduct achievement promotion activities through online and offline channels, introducing the technological advantages, application scenarios, and expected benefits of achievements to relevant enterprises, promoting the docking of achievements with enterprise demands. Establish an achievement absorption and transformation mechanism. Learned societies organize expert teams to provide technical guidance for enterprises, helping them cultivate professional technical talents and enhance their ability to absorb and transform technological achievements, ensuring that achievements can be smoothly applied and truly drive enterprise development through technological innovation.

3. Conclusion

As core hubs connecting the government, enterprises, universities, and research institutes, learned societies play an irreplaceable role in promoting the precision docking and collaborative tackling of technological demands for Xiangyang enterprises, enhancing their technological innovation capabilities, and fostering high-quality industrial development. Based on the actual development of Xiangyang´s "3+4" modern industrial system, this paper systematically analyzes the current status and existing problems of technological demand docking and collaborative tackling for Xiangyang enterprises based on the hub role of learned societies. It constructs a full-chain, closed-loop model centered on learned societies as the core hub, encompassing "precise demand excavation—efficient resource linkage—collaborative tackling implementation—achievement transformation and application—guarantee system support." This provides theoretical reference and practical pathways for promoting technological innovation and industrial transformation and upgrading of Xiangyang enterprises.

Funding Project:

Xiangyang Association for Science and Technology Science and Technology Societies Reform and Capacity Enhancement Project

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